IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): An apparatus which performs a plasma process on a target substrate by using plasma, comprising:

an airtight process chamber which accommodates the target substrate;

a gas supply system which supplies a process gas into the process chamber;

an exhaust system which exhausts an interior of the process chamber and sets the interior of the process chamber to a vacuum state;

first and second electrodes arranged in the process chamber to oppose each other, an RF field, which turns the process gas into plasma by excitation, being formed between the first and second electrodes;

an RF power supply connected to one of the first or second electrodes through a first interconnection and configured to supply RF power;

a matching circuit arranged between said one of the first and second electrodes and the RF power supply on the first interconnection and configured to serve to automatically perform input impedance matching relative to the RF power;

an impedance setting section provided in addition to the matching circuit and arranged between said one of the first and second electrodes and the matching circuit on the first interconnection, the impedance setting section being configured to select ~~amplify by a resonance action~~ a higher harmonic of a fundamental frequency of the RF power, which is input from the plasma into the first interconnection, and to set an impedance relative to the selected higher harmonic~~, and~~ thereby causing the higher harmonic to increase by a resonance action ~~set an impedance relative to the higher harmonic~~, the impendence setting section being capable of changing [[a]] the selected higher harmonic to be treated as a resonance target; and

a controller which supplies a control signal for controlling the impedance setting section to control a characteristic of a plasma process performed in the process chamber,

wherein the impedance setting section comprises:

an impedance change unit connected to the first interconnection through a shunt and configured to select [[a]] the higher harmonic as a resonance target, and

a filter disposed on the shunt between the first interconnection and the impedance change unit and configured to cut off the fundamental frequency of the RF power.

Claim 2 (Cancelled).

Claim 3 (Previously Presented): The apparatus according to claim 1, wherein the controller controls the impedance setting section to set the impedance such that a planar uniformity of the plasma process on the target substrate is improved.

Claim 4 (Previously Presented): The apparatus according to claim 1, wherein the controller controls the impedance setting section to set the impedance such that the plasma stabilizes.

Claim 5 (Cancelled).

Claim 6 (Previously Presented): The apparatus according to claim 1, wherein the impedance change unit comprises one or both of an arrangement which continuously changes the impedance with a continuous variable element, and an arrangement which changes the impedance stepwise by switching a plurality of fixed elements.

Claims 7-10 (Cancelled).

Claim 11 (Previously Presented): The apparatus according to claim 1, wherein a value of an impedance formed by the impedance setting section against the RF power is not less than twice a value of an RF load impedance formed by the process chamber and the plasma against the RF power.

Claims 12-17 (Cancelled).

Claim 18 (Previously Presented): The apparatus according to claim 1, wherein the filter has a high impedance of not less than 50Ω against harmonics other than a selected harmonic.

Claim 19 (Previously Presented): The apparatus according to claim 1, wherein the filter comprises a filter selected from the group consisting of a high-pass filter, bandpass filter, low-pass filter, and notch filter.

Claims 20-27 (Cancelled).

Claim 28 (Previously Presented): The apparatus according to claim 1, further comprising:

a second RF power supply connected to the other of the first and second electrodes through a second interconnection and configured to supply second RF power; and

a second matching circuit arranged between said other of the first and second electrodes and the second RF power supply on the second interconnection and configured to serve to automatically perform input impedance matching relative to the second RF power.

Claim 29 (Previously Presented): The apparatus according to claim 28, wherein the RF power supplied by the RF power supply connected to said one of the first and second electrodes is a first RF power which has a frequency higher than that of the second RF power.

Claim 30 (Previously Presented): The apparatus according to claim 28, wherein the RF power supplied by the RF power supply connected to said one of the first and second electrodes is a first RF power which has a frequency lower than that of the second RF power.

Claims 31-40 (Canceled).

Claim 41 (Previously Presented): The apparatus according to Claim 1, wherein the impedance setting section is configured to adjust a circuit defining the impedance to resonate with at least one of higher harmonics.

Claims 42-44 (Cancelled).

Claim 45 (Currently Amended): An apparatus which performs a plasma process on a target substrate by using plasma, comprising:

an airtight process chamber which accommodates the target substrate;

a gas supply system which supplies a process gas into the process chamber;

an exhaust system which exhausts an interior of the process chamber and sets the interior of the process chamber to a vacuum state;

first and second electrodes arranged in the process chamber to oppose each other, an RF field, which turns the process gas into plasma by excitation, being formed between the first and second electrodes;

an RF power supply connected to the first electrode though a first interconnection and configured to supply RF power;

a matching circuit arranged between the first electrode and the RF power supply on the first interconnection and configured to serve to automatically perform input impedance matching relative to the RF power;

an impedance setting section directly connected to the second electrode through a second interconnection, the impedance setting section being configured to select ~~amplify by a resonance action~~ a higher harmonic of a fundamental frequency of the RF power, which is input from the plasma into the second interconnection, and to set an impedance relative to the selected higher harmonic ~~and~~ thereby causing the higher harmonic to increase by a resonance action ~~set an impedance relative to the higher harmonic~~, the impedance setting section being capable of changing [[a]] the selected higher harmonic to be treated as a resonance target; and

a controller which supplies a control signal for controlling the impedance setting section to control a characteristic of a plasma process performed in the process chamber,

wherein the impedance setting section comprises an impedance change unit connected to the second interconnection and configured to select [[a]] the higher harmonic as a resonance target.

Claim 46 (Previously Presented): The apparatus according to claim 45, wherein the impedance change unit comprises one or both of an arrangement which continuously changes

the impedance with a continuous variable element, and an arrangement which changes the impedance stepwise by switching a plurality of fixed elements.

Claim 47 (Previously Presented): The apparatus according to claim 45, wherein a value of an impedance formed by the impedance setting section against the RF power is not less than twice a value of an RF load impedance formed by the process chamber and the plasma against the RF power.

Claim 48 (Previously Presented): The apparatus according to claim 45, further comprising:

a second RF power supply connected to the second electrode through the second interconnection and configured to supply second RF power; and

a second matching circuit arranged between the second electrode and the second RF power supply on the second interconnection and configured to serve to automatically perform input impedance matching relative to the second RF power.

Claim 49 (Previously Presented): The apparatus according to claim 48, wherein the RF power supplied by the RF power supply connected to the first electrode is a first RF power which has a frequency higher than that of the second RF power.

Claim 50 (Previously Presented): The apparatus according to claim 48, wherein the RF power supplied by the RF power supply connected to the first electrode is a first RF power which has a frequency lower than that of the second RF power.

Claim 51 (Previously Presented): The apparatus according to claim 45, wherein the impedance setting section is configured to adjust a circuit defining the impedance to resonate with at least one of higher harmonics.

Claim 52 (Previously Presented): The apparatus according to claim 45, wherein the impedance change unit is connected to the second interconnection through a shunt.

Claim 53 (Previously Presented): The apparatus according to claim 52, wherein the impedance setting section comprises a filter disposed on the shunt between the second interconnection and the impedance change unit and configured to cut off the fundamental frequency of the RF power.

Claim 54 (Previously Presented): The apparatus according to claim 53, wherein the filter has a high impedance of not less than 50Ω against harmonics other than a selected harmonic.

Claim 55 (Previously Presented): The apparatus according to claim 53, wherein the filter comprises a filter selected from the group consisting of a high-pass filter, bandpass filter, low-pass filter, and notch filter.